Invasive Exotic Plant Inventory

Introduction

Shenandoah National Park initiated surveys of areas likely to be infested with invasive exotic plants in 1997. By 2004, systematic surveys of Park roads and the Park boundary, as well as at a random subset of abandoned homesites, had been completed. A number of facts and patterns emerged from these studies, including:

•Exotic plants were found in the forb layer in 52 to 81% of transects in the three surveys. In each survey, garlic mustard (Alliaria petiolata) was the most abundant forb and was found to penetrate the furthest distance into the park.

•Exotic plants were found in the shrub layer 29 to 59% of transects in the three surveys. Oriental bittersweet (Celastrus orbiculatus), Japanese honeysuckle (Lonicera japonica) and small individuals of tree- of- heaven (Ailanthus altissima) were the most commonly encountered species.

•Exotic trees occurred in 11 to 30% of transects, with tree-of- heaven (Ailanthus altissima) being most abundant and occurring the furthest distance into the park.

•A weak tendency toward more exotics occurring in the North District and along South District roads was observed.

•Infested transects tended to occur near the bottom of north and east facing slopes of low steepness, though the tendency was weak and not consistent across species.

Above all, these data demonstrated that invasive exotic plants are widespread within Shenandoah National Park.

Wavyleaf basketgrass (Oplismenus hirtellus ssp. undulatifolius) is an invasive exotic species new to Virginia. It was recently found just inside the boundary of Shenandoah National Park.

Management Needs

Effective management of pest species, including invasive exotic plants, requires information on the distribution and abundance of the target organism. Identifying areas where pest species are just getting established, and where infestations occur in proximity to high value resources makes prioritization of treatment areas possible.

The Shenandoah National Park invasive exotic plant surveys, as well as other recent vegetation datasets, provide evidence of the extent of the invasive exotic plant problem in the Park.

Current Procedures

Today, effort is focused on finding invasive exotic plants in close proximity to high priority areas (e.g. rare species populations), or where they are just beginning to get established. Areas of the Park have been prioritized for inventory and possible management based on the presence of high value resources. Using a geographical information system, probability maps have been created that show the likelihood of occurrence of various invasive exotic plants in areas of the Park. Combining this information, the highest priority sites having the greatest probability of invasion are surveyed first.

A protocol has been developed that involves a thorough search of the unit being surveyed. The immediate vicinity of the high value resource(s) is searched first, followed by possible vectors of exotic plants (e.g. trails, streams). A global positioning system is used to record the extent of the survey area and the presence of invasive exotic plants.

In order to maximize the chance that new invasive exotic plants can be detected early, survey of areas that are likely sites of first establishment is done. These include roadsides (Highways 211 and 33), entrance stations, campgrounds, Park boundary sections bordering developed areas, powerline right- of- ways and other areas regularly disturbed or in close proximity to high levels of human activity.

Communication with Park employees working in the field, as well as the public, regarding species to be watched for (a so- called 'invasive exotic plant watchlist') is done. Employees engaged in vegetation and fisheries monitoring, boundary marking or other field tasks are in a great position to find new infestations while they can still be eradicated.

Invasive Exotic Plant Inventory (continued...)

Accomplishments

Exotic plant surveys have been completed in the vicinity of 51 rare plant populations. Management is underway or is being planned in a number of those sites.

Infestations of exotic species have been located in recent years in the early stages of invasion, including:
•Wavyleaf basketgrass (Oplismenus hirtellus ssp. undulatifolius). Apparently the first occurrence of this invasive species in Virginia, found along the Park boundary in 2005. Management is underway.
•Chinese yam (Dioscorea batatas). Two small patches discovered along Highway 211 and along a powerline right-of- way.
•Jetbead (Rhodotypos scandens). Reported by Park staff in 2007. Management is underway.

References

Hughes, J. 2007. Invasive Exotic Vascular Plant Watchlist for Shenandoah National Park. Shenandoah National Park, Luray, VA. 11 pp.

Hughes, J. 2008. Shenandoah National Park Exotic Plant Management Program Annual Report for FY2007. Shenandoah National Park, Luray, VA. 15 pp.

Hughes, J. and J. Åkerson. 2006. Shenandoah National Park Exotic Plant Surveys 1997- 2004. Final Report.

Invasive Exotic Plant Inventory (continued...)

Map showing calculated probability of occurrence of stiltgrass (Microstegium vimineum) in the North District of Shenandoah National Park.